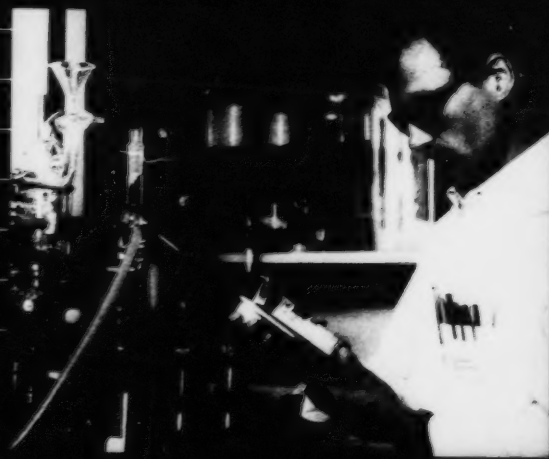




MANITOBA RESEARCH
COUNCIL

ANNUAL REPORT
1988-1989



Letter from the Chairman

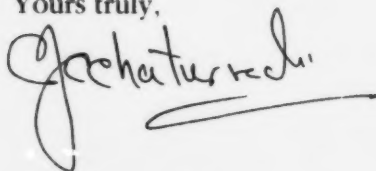
June 30, 1989

Honourable J.A. Ernst
Minister
Industry, Trade and Tourism
Room 358, Legislative Building
Winnipeg, MB
R3C 0V8

Dear Mr. Ernst:

I am pleased to submit for your consideration, the Annual Report of the Manitoba Research Council for the fiscal year ended March 31, 1989.

Yours truly,

A handwritten signature in dark ink, appearing to read 'M.C. Chaturvedi', with a long horizontal flourish extending to the right.

M.C. Chaturvedi
Chairman

From Front Cover:

MRC chemist Andy Wojtowicz monitors airborne workplace lead contamination with atomic absorption tests.

MRC manages the Manitoba Liquor Control Commission's quality assurance program. Here, food chemist Richard Henderson prepares to analyze a wine sample.

Corporate Profile

Working closely with industry, government and universities, the Manitoba Research Council (MRC) plays a lead role in encouraging and facilitating scientific research and technological development. As an agency of the Province of Manitoba, MRC also advises the government on developments in new technologies as they relate to the economic and social development of the province.

Through its operating units, MRC assists industry in the development and implementation of appropriate technology. MRC provides food technology services from its facilities in Portage la Prairie and industrial technology services from its Winnipeg facilities. MRC has co-operative initiatives with the University of Manitoba in both the Mechanical Engineering Department and the Food Science Department.

MRC's complement of services and capabilities is as follows:

Industrial Technology Services (Winnipeg)

- Electronic Design
- Equipment Retrofit
- Finite Element Analysis
- Air Quality Monitoring
- Environmental Chemistry
- Hazardous Waste Analysis
- Leachate Testing
- PCB Analysis
- Trace Metals and Organics
- Transformer Gas Analysis
- Vibration Analysis
- Integrated Circuit Design
- Machine Design
- Material Engineering
- Mechanical Design
- Noise Analysis
- Physical Testing
- Printed Circuit Board Layout
- Prototyping
- Software Development
- Surface Mount Technology

Food Technology Services (Portage la Prairie)

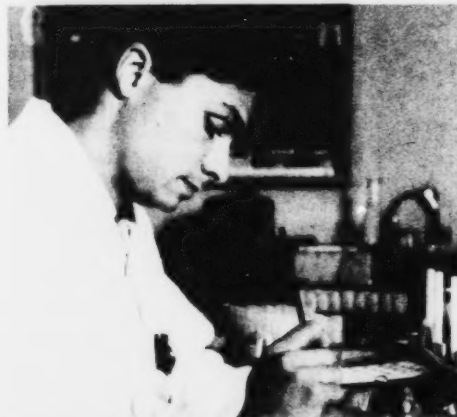
- Product Feasibility Studies
- Ingredient Sourcing & Evaluation
- Recipe Development
- Colour, Viscosity & Texture Testing
- Quality Assurance Programs
- Plant Sanitation Audits
- Shelf-Life Studies
- Regulatory Compliance Assistance
- Product Formulation
- Consumer Preference Studies
- Process Development
- Test Market Production
- Nutrition Labelling Assistance
- Pesticide Residue Detection
- Chemical & Microbiological Assessments

Technical Information and Advisory Services (Winnipeg and Portage la Prairie)

- Computer Data Searching
- Information Sourcing
- Interlibrary loans
- Literature Searches
- Technical Evaluations

Co-operative Initiatives

- University of Manitoba
 - Advanced Industrial Materials Initiative
 - Institute for Technological Development
 - Agri-Food Biotechnology Initiative
- National Research Council of Canada
 - Industrial Research Assistance Program
 - Research Institute Support Program



Technologist, Tom Hunt, at work in the microbiology laboratory testing a client's product for regulatory compliance.

Chairman's Report

This was a year of change, a year in which we have become increasingly aware that Canada is part of a global economy which presents increased market opportunities, but demands that we become more competitive and innovative. It is an economy in which industry and government must place increased emphasis on research and the knowledgeable use of technology in the development of resources, products and markets.

The challenge which we face is to address these factors in charting a course for the future economic growth of Manitoba. It is in this context that the MRC Board established plans which call for MRC to: maintain currency in leading edge technologies which may benefit Manitoba; maintain an awareness of science and technology issues and requirements of Manitoba industry; be conversant with national science and technology issues and policies; and provide the Minister, Industry, Trade and Tourism with advice and recommendations on science and technology issues which may affect the economy of Manitoba.

To achieve these objectives the Board recognized that MRC must become a more dynamic and responsive organization. After study and evaluation of many factors, the Board concluded that the technical centres and administration of MRC should be placed under a unified corporate structure to permit:

- administration and accounting overhead costs to be reduced;
- marketing programs to be developed to promote the overall services of MRC;
- existing technical services to be managed and integrated to the benefit of MRC clients;
- the effective diffusion of technology to Manitoba industry;
- the development of technical services through joint ventures and strategic alliances with research, educational and consulting organizations and institutions;
- and the effective employment of MRC's resources in the development of new services and the maintenance of essential existing services.



The Board also recognizes that if MRC is to provide essential services to industry and advice to the Minister, it must maintain a full awareness of the technical issues and problems which affect industry. Accordingly, the Board has expanded MRC's Advisory Committees to include additional representation from Manitoba industrial and economic development associations, and concurrently has encouraged MRC staff participation in these organizations. Similarly, the Board requires and would benefit from, the appointment of additional members from Manitoba industry.

In adopting this plan the Board is aware that significant investments may be required for MRC to remain a centre of excellence and provide competent technical advisory services to industry and government. The Board is confident that these plans will provide for the continued vitality and growth of MRC.

I wish to acknowledge the support of the Hon. J.E. Ernst, Minister of Industry, Trade and Tourism, who has encouraged the development of MRC as part of an overall provincial innovation strategy. I wish to extend my expression of thanks to my fellow Board members for their work and commitment to the future development of MRC. Finally, I wish to thank the management and staff of MRC. In this year of change MRC has performed well, and successes have been realized through their work and dedication to the organization and its clients.

A stylized handwritten signature in dark ink.

M.C. Chaturvedi,
Chairman

President's Report

1988/89 was a year of restructuring and growth – it was a year of preparing MRC for the next decade. Early in the year, a detailed survey was conducted of 375 clients and potential clients, as well as all staff. The purpose of the survey was to gain an understanding of how MRC and its services are perceived by clients, to determine if the service mix suits the needs of local industry, and to provide background for marketing and promotion. It also was conducted to gain staff feedback on organizational and management needs.

Survey results indicated very high client satisfaction – 90% of clients indicated that they will return for additional work and will recommend services to others. There was strong agreement of local industry that government should assist business with technical research and development. There was further strong agreement that MRC had a key role in servicing small Manitoba businesses and that developing strong linkages with local industry and Manitoba universities is very important. Finally, the survey indicated an essential need for a greater level of advertising and promotion, a need to clarify the organization and to simplify a complex structure to enhance efficiency, increase productivity and reduce overhead. Based on these survey results and Board input, significant organizational restructuring was initiated late in the year, with the goal of creating a new, unified MRC, ready to meet the challenge of the 90's.

MRC has a client data base of 1726 Manitoba enterprises, of which 76% are located in Winnipeg and 24% in rural Manitoba. Under MRC's industrial advisory programs which are supported both by the grant from the Province of Manitoba and by the National Research Council of Canada IRAP contribution agreement, MRC responded to 10,900 client enquiries during 1988/89.

MRC continued to benefit from its strategic alliances with other Provincial Research Organizations, the National Research Council of Canada and local educational institutions. The positive benefits gained through the agri-food biotechnology and advanced industrial materials initiatives at the University of Manitoba are anticipated to be expanded during the coming year through development of a direct alliance with the U of M Food Science Department which will enhance services for the local food industry by linking MRC food technology capabilities with U of M food science expertise.

During the year, MRC had total revenues of \$5.421 million as compared to \$5.308 million in 1987/88. Contract revenues were



\$2.401 million in 1988/89 as compared to \$2.240 million in 1987/88. Overall self-sufficiency increased from 45% to 47.2%. During 1988/89, 521 contracts were completed. Of these, 390 projects were for Winnipeg clients, 82 projects were for rural Manitoba clients and 49 projects were for out-of-province clients.

There was a significant increase in contract work for industrial clients during the year. The value of work for industry increased from 41% of total contract revenue in 1987/88 to 60% of total contract revenue in 1988/89.

During the year, expenses exceeded revenues by \$374. As is shown in the financial tables, all MRC assets were depreciated at the beginning of the year to accommodate new MRC policy. This involved establishment of a reserve for depreciation commencement.

I wish once again to acknowledge continued support from both the Province and the National Research Council which provide MRC's comprehensive technology transfer infrastructure to local small- and medium-sized enterprises.

I also wish to thank the Board and especially the members of the executive committee – Mahesh Chaturvedi, John Ingraham and Derek Johannson – for their continued support and hard work.

Finally, I wish to thank all MRC staff – our most valuable resource – for their professionalism, hard work and dedication in making MRC achieve its goals and effectively meet the needs of Manitoba industry.

A handwritten signature in dark ink, reading "Erling Nyborg". The signature is fluid and cursive, with the first name "Erling" and last name "Nyborg" clearly distinguishable.

Erling Nyborg,
President

MRC Services

The Manitoba Research Council provides industry and government with technical information, advisory and contract services through its industrial technology facilities in Winnipeg, through its food technology facilities in Portage la Prairie and through joint-venture initiatives with the University of Manitoba and the National Research Council of Canada. Services range from the

sourcing of information on products, components and patents for local industry and entrepreneurs, the provision of advisory services to address specific technical problems facing industrial clients and conducting projects on a contract basis for industrial and government clients in Manitoba, other parts of Canada and the world.

Industrial Technology Services

The Manitoba Research Council provides industrial technology services to Manitoba, national and international clients, in product design, product development and testing from its Winnipeg facilities. MRC helps industrial clients increase their efficiency and productivity and provides assistance at all stages of the product development cycle, from concept evaluation to test market launch. By using MRC's professional and integrated services in mechanical engineering, electronics, environmental and analytical chemistry, materials science and computer-aided engineering, Manitoba companies can become more competitive regionally, nationally and internationally.

Electronics Engineering

Electrical and electronics engineering provides design, product development assistance and general consulting services. Design services include electronic circuit design, printed circuit board design, communications systems design and industrial applications. Product development services include product selection assistance, product testing, evaluation and electronic retrofitting of manufacturing equipment.

Mechanical Engineering

Mechanical engineering provides specialized product design and analysis services. Technical capabilities include functional analysis, structural integrity assessments, system dynamics studies and evaluations of safety and cost effectiveness. Specialized services are available in vibration analysis, noise control, finite element analysis, solids modelling and computer-aided engineering.

Custom machining and fabrication services are employed as part of an overall product development service to produce and test prototypes to designated specifications.

Environmental and Analytical Chemistry

A wide range of chemical and environmental services are provided to industry including analysis, testing and product development. Capabilities include industrial and hazardous waste analysis, workplace air quality monitoring, fuels and lubricants testing, transformer gas analysis, contaminant identification and specification verification. Product development capabilities include material evaluation and sourcing, micro-organism identification, formula review, quality control testing and process evaluation.

Specialized Testing Services for Industry

MRC assists companies in testing their products for compliance to many national and international standards and regulations. MRC is accredited by the Standards Council of Canada for a large range of mechanical, physical, chemical and metallurgical tests. Specialized testing programs can be developed to suit specific client needs.



MRC engineer Guoguang Chen using finite element analysis to evaluate a product design.

1988/89 Highlights - Industrial Technology Services

- The environmental and analytical chemistry laboratory developed the capability to perform leachate testing to help industry meet new provincial requirements. This capability was developed with assistance from the National Research Council of Canada IRAP-H program.

- industrial hygiene services in air quality monitoring showed increased demand, with projects being undertaken for schools, foundries and smelters, welding shops, printing operations, a recreational vehicle manufacturer, a cabinet manufacturer, the plastics industry, and several other industrial clients.

- in conjunction with Motor Coach Industries, a project involving the design of a wheelchair lift mechanism for an intercity bus was completed. The electro-hydraulic unit, mounted in the side of the bus, has been designed to accommodate variable curb heights, and to accept the flexure and stresses of an intercity bus without seizing or binding.

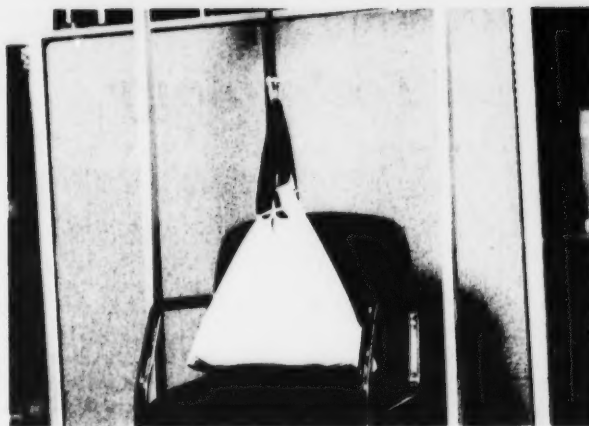
- the International Development Research Corporation, commissioned a project on behalf of the Pakistan Council of Science and Industrial Research in Pakistan. A dobby mechanism was designed to introduce pattern weaving onto cottage industry looms. A key consideration in the design was to ensure the unit could be manufactured within the technologically limited industrial sector of Pakistan. The product is also to be licensed for manufacture in other third world countries.

- a program to monitor several heat pump installations, utilizing the energy available in groundwater, was initiated. This is a program co-sponsored by the Canadian Electrical Association, Energy Mines and Resources Canada, Manitoba Energy and Mines and Manitoba Hydro.

- a project involving finite element analysis of grain bins designed by a Manitoba manufacturer to determine their structural integrity in high winds was completed.

- a service involving dryer balancing in pulp and paper mills was developed. The dryer end of a paper machine contains a number of heavy cylinders over which the paper stock passes in the final stages of production. The greater the speed of these cylinders the more paper is produced. Any imbalances in these cylinders will limit the speed of rotation and the rate of production.

- a project was undertaken to evaluate the structural integrity of the frame design of two



MRC provides furniture testing services to BIFMA/ANSI/CSA Standards for industry.

intercity buses. The process involves placing the rear end of the bus on a "shaker" (a hydraulic cylinder which can be oscillated at high speeds). Sensors are placed at strategic points on the bus frame to collect data relating to stress and movement. The bus is vibrated at a number of frequencies. These data, once fed to a computer, provide a detailed appraisal of the structure in a numerical and semi-animated format.

- as part of developing a client's product for manufacture, the MRC trained staff, and purchased the equipment necessary to provide design and prototyping capabilities using surface mount technology. This is the only surface mount design and prototyping capability available in Manitoba.

- a product development project for "Trip-Trac" has been ongoing for about two years. "Trip-Trac" is an electronic device which monitors business and personal mileage in automobile fleets. Additionally, it provides maintenance information. The initial project involved circuit board design, prototype manufacture, field testing and design of an Application Specific Integrated Circuit (ASIC). The most recent developments have included the design of this device using Surface Mount Technology, an enhancement which allows for more cost effective manufacture, and greater reliability.

- a project was undertaken for a shoe manufacturing company involving the retrofitting of the electronic control equipment for a pattern generating sewing machine, and the transfer of pattern programs from a tape format to a computer disk format. The first of eight units were converted, successfully tested, and reinstalled in the client's plant. A second unit will be shipped to MRC in the near future to continue the process of conversion.

- a furniture testing program was developed for a Manitoba furniture manufacturer to enable the manufacturer to submit a tender for a large out-of-province institutional contract. This program required cyclical tests consisting of 100,000 cycles, or more, per test, within specific timeframes needed by the client. The tests were completed successfully, and the manufacturer won the contract.

Food Technology Services

The Manitoba Research Council provides food technology services to Manitoba, national and international food, feed and beverage industries through its facilities in Portage la Prairie. MRC provides clients with access to an integrated research, product development, testing and pilot-scale production facility. It offers clients the expertise and experience of a dedicated team of food scientists, engineers, technicians and specialist consultants, the resources clients need to develop new and better products, and more cost-effective production techniques.

Food Product Development

Product development activities range from turning an idea into a new food product to finding uses for by-products. Expertise and equipment are available to conduct flavour, colour and texture analyses, as well as sensory evaluation to suit home, restaurant and institutional food requirements.

Food Engineering

Food Engineering services include consulting assistance in process development and optimization, equipment specification and selection, plant layout and design, and energy conservation.

Pilot Plant

The pilot plant is equipped and serviced for production of new food products on a trial basis. Technical skills and equipment are available to assist with process development in the areas of dairy and meat products, fruit and vegetables, and cereal technology (including baking). Processing capabilities include cooking, blanching, freezing, battering and breading, drying and membrane separation. The pilot plant is Meat Hygiene Directorate inspected so test products containing meat can be distributed interprovincially and internationally.

Microbiology

Microbiological laboratories are equipped to evaluate foods for spoilage and pathogenic organisms. Facilities for both enumeration and identification are available on site, including consulting assistance in food plant sanitation and microbiological procedures.

Food and Analytical Chemistry

Chemical analysis services range from routine protein, fat and moisture determination to sophisticated tests for trace constituents

and contaminants, such as vitamins and pesticides. In addition to a well-equipped wet chemistry facility, instrumental capabilities include gas chromatography with flame ionization, nitrogen-phosphorous, and electronic capture detectors. High Pressure Liquid Chromatography capability includes gradients, computer workstation and refractive index, variable wavelength UV, and spectrofluorescence detectors.

Specialized Testing Services for the Food Industry

MRC is accredited by the Standards Council of Canada for a range of specific chemical and microbiological tests of importance to the food industry. Specialized testing programs can be developed to suit specific client needs.



Food chemist Joan Buttazoni analyzes food-grade oils for their specific gravity.

1988/89 Highlights - Food Technology

- A three-day food technology course was developed and presented to two groups of National Research Council Industrial Technology Advisors. Forty ITA's from across Canada attended the courses.

- formulation modifications were undertaken on a Manitoba processor's line of bakery products. The processor is now marketing the improved products.

- a snackfood prototype was developed for a Manitoba company to increase usage of their primary product.

The company plans to conduct processing tests followed by consumer tests next year.

- a preserve featuring a native Manitoba berry was developed and shelf-life testing is currently being conducted. Plans are underway for production of test market quantities.

- a federally-sponsored project on the testing of membrane technologies for the concentration of low sugar substrates for the production of ethanol continued during 1988.

- honey from several producers in Manitoba and Saskatchewan was tested for antibiotic and bee repellent residues. Certification of compliance with residue limits is necessary to sell or export honey.

- several meat processors had products tested for compliance with federal compositional standards and nutritional quality factors such as protein, fat, lean, dextrose equivalent, and cholesterol.

- vegetable growers and processors were supported through testing products for frying oil uptake, confirmation of raw material and product specifications, and studies on the effect of processing on finished product composition.

- Manitoba dairy processors were supported through nutritional analyses of their products and by helping to identify causes and corrective actions for processing problems.

- grain products were tested for nutritional factors such as protein, dietary fibre, cholesterol, minerals, as well as for pesticide and mycotoxin residues.

- several provincial departments requested testing services and advice related to dairy products, public health and other concerns.

- comprehensive testing for products of the Manitoba Liquor Control Commission continued, as the main thrust of their quality control program.



Food technologist, Janice Meseyton, working on a recipe scale-up project for a food service company.

- monitoring of dairy, meat, and other food products for pathogenic bacteria continued to ensure client product safety. **Listeria** and **Salmonella** remain the chief microbiological concerns. Several new clients began to use MRC's services and expertise in this area on a routine basis.

- industrial problem solving included work on pork bellies being exported to the United States.

- several companies were assisted with label applications to Agriculture Canada for meat products.

- goats' milk continued to be pasteurized and packaged in the pilot plant for a large Manitoba goat farm. Distribution now includes Safeway and Supervalu stores in Manitoba, Saskatchewan and Northwestern Ontario.

- production of several products for retail sale occurred during the year in MRC's food pilot plant. These included a cocktail mix, raspberry juice, pizza crust and sauce, and beef jerky.

- a new service in the pilot plant - retail packaging of food products - was initiated with the packaging of President's Choice brand frozen fish strips and nuggets for Fishery Products International of St. John's, Newfoundland. The product was distributed nationally by the Loblaw's/Supervalu chain of stores.

Technical Information and Advisory Services

The Manitoba Research Council offers technical information and technological advice to Manitoba industry. This program includes information and advisory services funded by the Province and by two contribution agreements with the National Research Council of Canada for the delivery of the Industrial Research Assistance Program (IRAP); and the Research Institute Support Program (RISP). Through these services and programs MRC helps industry solve technical problems, improve productivity, and introduce new materials, equipment and technology. There is no charge to industrial clients for services under this program. Available assistance includes: on-site technical problem definition and solution development; library services; literature and database sourcing; information on the availability of government assistance programs; demonstrations of PC and mainframe-based CAD/CAM systems; and technical advice to the Regional Development Corporations and other government departments.



Clients and MRC staff access technical information through MRC's libraries in Portage la Prairie and Winnipeg.

Information services are available through MRC's library facilities in Portage la Prairie and Winnipeg. These services provide industrial clients with access to extensive holdings of books, journals, catalogues, standards and government regulations. In addition, worldwide information is available through computer access to more than 300 technical databases. MRC's library staff assists clients in accessing these materials directly or through IRAP.

1988/89 Highlights

In assisting Manitoba industry and entrepreneurs to access technology, technical information and advice needed to resolve specific product development, manufacturing and other technical problems, MRC responded to 10,900 client enquiries, of which 2695 (24.7%) were located in rural Manitoba, 7475 (68.6%) in Winnipeg, and 740 (6.7%) out of province. During the year staff also helped local industry obtain funding for 251 IRAP-L; 77 IRAP-H; and 14 IRAP-M projects. Some examples of technical advisory services provided to local manufacturers include:

- a heavy equipment manufacturer identified a problem with delays in the manufacturing process, with the client's staff spending excessive time waiting for tasks to be completed and searching for parts. A space usage analysis identified problems in inventory control, work in process control, and overall plant workflow. Labour reductions in excess of 1,500 man-hours per year were realized on implementation of recommended changes
- a food catering company specializing in ethnic foods requested assistance in identifying a better method of stretching dough for the production of Kinish. Equipment was sourced and tested, resulting in improved operations by reducing time and cost for production.
- a local construction contractor identified an access problem for handicapped individuals caused by existing door closers. The contractor was assisted in sourcing an alternative door closer which allowed handicapped access and met new legislative requirements.

Working with the University Community

The Manitoba Research Council and the University of Manitoba have entered into agreements for the following joint-venture initiatives.

Advanced Industrial Materials Initiative

This is a co-operative initiative of MRC and the Department of Mechanical Engineering at the University of Manitoba. There are three elements: joint research and development; joint technology transfer in the field of metallurgy and materials science; and advisory services to industry. The R&D component includes work in the field of advanced industrial materials such as rapidly solidified alloys, superalloys, new steels, plastics, ceramics, and composites. The program's objectives are to improve the productivity of the manufacturing sector using or producing these materials, and to assist Manitoba companies in adopting new materials or processes.

Agri-Food Biotechnology Initiative

This is a co-operative initiative of MRC and the Department of Food Science at the University of Manitoba. The purpose of this biotechnology initiative is the development of new agri-food products that are based on monoclonal antibody technology. Areas of interest include food safety, food toxicology and development of identification techniques. Located on the University campus, this initiative draws on the expertise of MRC food technology personnel as well as faculty members of the Food Science Department.

Institute for Technological Development (ITD)

ITD is a co-operative venture among the Manitoba Research Council, the National Research Council, the University of Manitoba and Manitoba industry. The primary objectives of the ITD are to encourage communication between industry and university researchers, to facilitate technology transfer from the University to local industry, and to support co-operative R & D to improve the competitiveness of local industry. ITD performs a variety of technology transfer and networking activities to meet these goals.

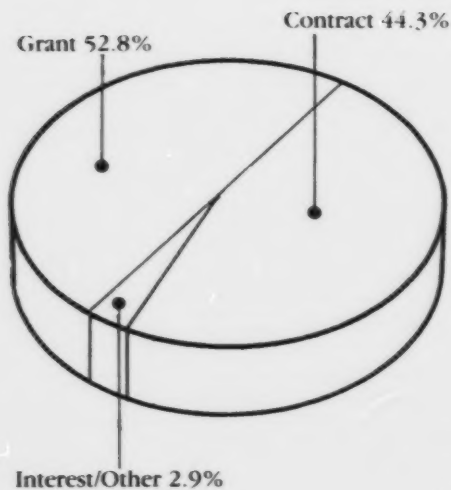


Discussing a client's idea for a new product is part of MRC's advisory services.

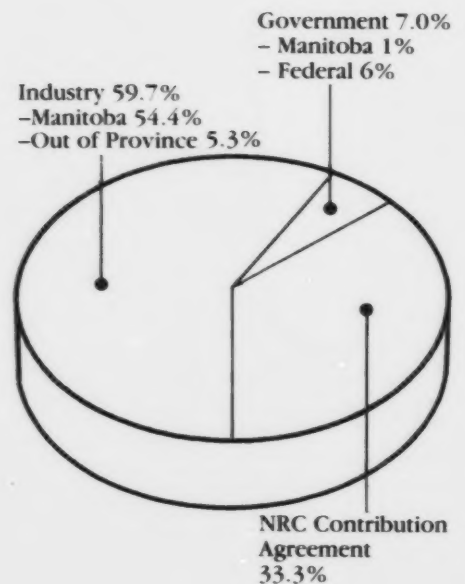
Financial Summary

	1988/89	1987/88
Income		
Contracts	\$ 2,400,618	\$ 2,240,073
Grant from Province of Manitoba	2,862,400	2,917,900
Interest/Other	157,968	150,099
Expenses		
Operating	\$ 5,757,236	\$ 4,967,723
Capital	-	508,933
Appropriation from Reserve for Depreciation Commencement	(335,876)	-
Net Expense	\$ 374	\$ 168,584

SOURCES OF REVENUE 1988/89



SOURCES OF CONTRACTS 1988/89



Auditor's Report



THE MANITOBA RESEARCH COUNCIL REPORT OF THE PROVINCIAL AUDITOR'S OFFICE

We have examined the financial statements, being Exhibits A, B and C and Schedule 1, of The Manitoba Research Council for the fiscal year ended March 31, 1989. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, the financial statements present fairly the financial position of The Manitoba Research Council as at March 31, 1989 and the results of its operations for the year then ended in accordance with the accounting policies stated in note 2 to the financial statements applied, except for the change in the method for the recording of fixed assets as explained in note 7, on a basis consistent with that of the preceding year.

F.H. Jackson, CA,
Provincial Auditor.

June 5, 1989
Winnipeg, Manitoba

EXHIBIT A Balance Sheet as at March 31, 1989 (with 1988 figures for comparison)

	1989	1988
ASSETS		
Current:		
Cash	\$ 7,000	\$ 5,500
Funds on deposit with the Minister of Finance:		
Trust accounts	238,461	396,674
Term deposits	1,119,333	1,348,892
	<u>1,357,794</u>	<u>1,745,566</u>
Accounts receivable:		
Government of the Province of Manitoba	19,372	20,549
Other, net of allowance for doubtful accounts of \$8,386 (1988 - \$33,394)	367,740	300,092
	<u>387,112</u>	<u>320,641</u>
Prepaid expenses	33,363	25,198
Building held for resale (Note 4)	80,000	
	<u>1,865,269</u>	<u>2,096,905</u>
Fixed:		
At cost (Note 7)		7,779,579
At cost less accumulated depreciation (Notes 2b, 3, 7)	1,555,794	
	<u>\$ 3,421,063</u>	<u>\$ 9,870,284</u>
LIABILITIES AND FUND BALANCES		
Current:		
Accounts payable	\$ 348,325	\$ 384,467
Advances on contracts	425	1,410
	<u>348,750</u>	<u>385,877</u>
Loan payable (Note 6)	69,905	80,546
	<u>418,655</u>	<u>466,423</u>
Funds retained for future operations, Exhibit B	1,710,108	1,630,482
Reserve for commencement of depreciation policy, Exhibit C (Note 8)	1,292,300	
Investment in fixed assets (Note 7)		7,779,579
	<u>\$ 3,421,063</u>	<u>\$ 9,876,484</u>

EXHIBIT B**Statement of Revenue and Expenditure and Funds Retained for Future Operations for the year ended March 31, 1989 (with 1988 figures for comparison)**

	1989	1988
Revenue		
Grants from the Government of the Province of Manitoba	\$ 2,862,400	\$ 2,917,900
Contracts	2,400,618	2,240,073
Interest	120,441	115,582
Sundry revenue	37,527	34,517
Total revenue	5,420,986	5,308,072
Expenditure, Schedule 1:		
Operating	5,757,236	4,967,723
Capital (Note 7)	—	508,933
Total expenditure	5,757,236	5,476,656
Results of operations – excess of expenditure over revenue	336,250	168,584
Appropriation from Reserve for commencement of depreciation policy	335,876	—
Excess of expenditure over revenue after appropriation	374	168,584
Balance of Funds retained for future operations at beginning of year:		
As previously reported	1,630,482	1,799,066
Adjustment re change in accounting policy (Note 7)	1,708,176	—
As restated	3,338,658	1,799,066
Transfer to establish Reserve for commencement of depreciation policy	(1,628,176)	—
Funds retained for future operations, end of year	\$ 1,710,108	\$ 1,630,482

EXHIBIT C**Reserve for Commencement of Depreciation Policy (Note 8) for the year ended March 31, 1989 (with 1988 figures for comparison)**

	1989	1988
Transfer from Funds retained for future operations	\$ 1,628,176	\$ —
Transfer to Funds retained for future operations	335,876	—
Balance, end of year	\$ 1,292,300	\$ —

SCHEDULE I**Schedule of Expenditures for the year ended March 31, 1989 (with 1988 figures for comparison)**

	1989	1988
Expenditures:		
Operating (Note 5):		
Advertising and promotion	\$ 89,068	\$ 65,448
Bad debts	5,591	14,498
Building maintenance and repair	65,618	62,070
Computer related expenses	159,112	113,593
Depreciation (Note 7)	373,275	—
Equipment-rentals, maintenance and repair	106,203	97,529
Fees-memberships, seminars, customs and audit	58,135	109,126
Heating and utilities	90,374	75,517
Interest on loan	11,370	12,507
Laboratory supplies	264,310	249,686
Library - consultants and publications	45,404	72,136
Miscellaneous	1,565	1,642
Postage, delivery and telephone	137,158	130,353
Printing and stationery supplies	78,134	75,944
Purchased testing services	96,761	147,059
Real estate rental and property taxes	282,483	291,647
Salaries and employee benefits	3,702,831	3,313,577
Staff transfer and relocation costs	16,500	15,467
Travel and transportation	173,344	119,924
	5,757,236	4,967,723
Capital (Note 7):		
Equipment and furnishings	—	508,933
Total expenditures, Exhibit B	\$ 5,757,236	\$ 5,476,656

**Notes to Financial Statements
for the year ended March 31, 1989**

1. Nature of Operations

The Manitoba Research Council was established in 1963 with the following objectives:

- a) to promote and carry on research and scientific enquiries respecting agriculture, natural resources, industry or other segments of the economy of the province; and
- b) to secure for Manitoba the benefits of research and scientific enquiries carried on elsewhere.

The Manitoba Research Council operates two laboratory facilities, the Canadian Food Products Development Centre in Portage la Prairie and the Industrial Technology Centre in Winnipeg.

2. Significant Accounting Policies

- a) These statements are prepared on an accrual basis of accounting except contract revenue is recognized when billed. Billings are made as work is completed during the project.
- b) Fixed assets are recorded at cost, less applied grant funds and accumulated depreciation. Depreciation is calculated on a straight-line basis at the following rates:

Automobiles	20%
Computer equipment	20%
Equipment	10%
Furniture and fixtures	10%
- c) Certain general and administrative services are provided by the Province of Manitoba at no cost to the Council. These costs are not reflected in the financial statements. (Note 5).

3. Fixed Assets

	Cost	Funded by Government of Canada	Accumulated Depreciation	Book Value
Automobiles	\$ 20,000	\$ 20,000	\$ -	\$ -
Computer equipment	1,305,674	514,617	561,273	224,784
Equipment	4,440,451	1,945,029	1,202,643	1,292,779
Furniture and fixtures	234,393	131,481	64,681	38,231
	<u>\$ 5,998,518</u>	<u>\$ 2,611,127</u>	<u>\$ 1,831,597</u>	<u>\$ 1,555,794</u>

During 1986, the building and associated land owned by The Manitoba Research Council for the Canadian Food Products Development Centre facility were transferred to Manitoba Properties Inc. The Council retains the use of these buildings and continues to pay the related operating costs, exclusive of rent, which is paid from an appropriation of the Government of the Province of Manitoba.

4. Building Held for Resale

The building held for resale, acquired in 1986 for \$80,000, is located on land leased from the City of Winnipeg. Council is currently in the process of purchasing the land and is negotiating with a prospective buyer for the sale of the land and building.

5. Administrative Expenditures

The Government of the Province of Manitoba incurs certain general and administrative expenses, including office space and utilities, on behalf of the Council. These are estimated to be \$4,100 - 1989 (1988 - \$18,300).

6. Loan Payable

During the 1984 fiscal year, certain improvements were made to the facilities of the Industrial Technology Centre at a cost of \$117,000. The cost was financed by way of a loan repayable over ten years in equal monthly installments of \$1,855.63 including principal and interest. As at March 31, 1989, the outstanding loan principle amount was \$69,905.

7. Change in Accounting Policy

Effective April 1, 1988, Council changed its accounting policy for the recording of fixed assets. Previously, fixed asset acquisitions were charged to operating expenditures in the year of acquisition. The balance sheet reflected fixed assets at cost with a corresponding credit to an account called "Investment in fixed assets". The fixed assets previously recorded at cost and the offsetting investment in fixed assets were written off against each other as of April 1, 1988. The new policy is to capitalize fixed asset acquisitions and depreciate them over the estimated useful life of the asset in a manner consistent with generally accepted accounting principles.

The change in accounting policy has been initiated by determining the amount of depreciation that would have been charged in prior periods under the new policy and reflecting \$1,708,176 as the undepreciated value of the fixed assets as at April 1, 1988 in the accounts. This amount is also shown as an adjustment of opening balance of Funds retained for future operations as of April 1, 1988 on Exhibit B. Prior period figures have not been restated to reflect this change in accounting policy.

The effect of this change in accounting policy is to increase fixed assets subject to depreciation by \$1,555,794, to increase building held for resale by \$80,000 and to increase Funds retained for future operations by \$1,635,794 as of March 31, 1989, and to increase the excess of expenditure over revenue by \$2,383 for the year then ended.

8. Reserve for Commencement of Depreciation Policy

The Board of Directors has approved the establishment of a reserve to be entitled "Reserve for commencement of depreciation policy". The reserve was established by appropriating an amount of \$1,628,176 from Funds retained for future operations. Each year, by motion of the Board, an amount will be transferred to Funds retained for future operations from the Reserve for commencement of depreciation policy. The amount of the transfer is intended to be equivalent to the depreciation calculated for the year on fixed assets recorded as of April 1, 1988, when the new fixed asset accounting policy was adopted. However, the transfer may be in such other amounts as the Board determines to be appropriate.

9. Comparative Figures

Comparative figures for the year ended March 31, 1988 have been restated to conform with the presentation adopted for the current year.

Publications, Papers, & Presentations

Begin, J.

"Vibration Analysis in Industrial Settings", presented as a guest lecture to the University of Manitoba, Faculty of Engineering

Lypka, G.

"Sampling and Handling of Hazardous Wastes", presented at the On-Site Program sponsored through Energy Pathways Inc. and Employment and Immigration Canada, June, 1988.

"Monitoring Techniques for Indoor Air Quality", presented to the American Industrial Hygiene Association quarterly meeting, Winnipeg, October, 1988.

Smyrl, T.

"Available Resources for Your Potential Business", presented at the Small Business Week Seminar, Brandon, Manitoba, October 1988.

"Considerations When Developing a Food Product for the Commercial Market", presented at the St. Jean Farm Days Trade show, January, 1989.

"Developing Your Product Ideas for the Commercial Market", presented at a workshop sponsored by the Prairie Fruit Growers Association, March, 1989.

Sprung, W.

"Occurrence of *Listeria monocytogenes*, *Campylobacter* spp. and *Yersinia enterocolitica* in Manitoba Raw Milk", Canadian Institute of Food Science and Technology Journal, Vol. 22, No. 1, 1989.

"Quality Control in the Meat Industry", presented at the Student Night of the local chapter of the Canadian Institute of Food Science and Technology, November, 1988.

"Microbiological Air Quality", "Listeria" presented as a guest lecture at the University of Manitoba Food Microbiology Short Course, March, 1989.

"Food Microbiology Testing", presented at the Quality Assurance Conference sponsored by the University of Saskatchewan and Saskatchewan Agriculture, May 1988.

"Microbiological Criteria in Foods and Food Ingredients", presented at the Food Bev Ex Seminar Series, Toronto, December, 1988.

Sprung, W. and Sullivan, V.

"Radurization of Commercial Freshwater Fish Species", International Journal of Radiation Applications and Instrumentation, Part C, Vol. 31, Nos. 1-3, 1988.

Sullivan, V.

"The Quality Aspects of Take-Out Foods", presented at the Manitoba Restaurant and Foodservice Association Annual Convention, October, 1988.

Wilton, G.

"Some Notes on Using a Computer in a Small Special Library", Manitoba Library Associates Bulletin, Vol. 17, No. 3, 1988.

Zawistowski, J.

"Isolation and Characterization of an Acidic Fraction of Jerusalem Artichoke Polyphenol oxidase", presented at the Canadian Institute of Food Science and Technology Convention, Winnipeg, May 1988.

"Dynamic Rheological Properties of Starch Gels", presented at the American Association of Cereal Chemists 3rd Annual Meeting, San Diego, October, 1988.

"Purification and characterization of Jerusalem artichoke (*Helianthus tuberosus* L.) polyphenol oxidase", Journal of Food Biochemistry, 12:1.

"Isolation and characterization of an acidic fraction of polyphenol oxidase from Jerusalem artichoke (*Helianthus tuberosus* L.) tubers", Journal of Food Biochemistry, 12:23.

"Heat sensitization of *Bacillus subtilis* spores by selected spices", Journal of Food Safety, 9:83.

"Immobilized metal affinity chromatography of germinated wheat alpha-amylase", Cereal Chemistry, 65:113.

"Viscoelastic behavior of aging starch gels: effects of concentration, temperature and starch hydrolyzates on network properties", Cereal Chemistry, (submitted).

Staff & Corporate Memberships

During the year, MRC staff have been involved on various boards, committees and working groups associated with the following organizations.

American Library Association
American Association of Cereal Chemists
American Conference of Governmental Industrial Hygienists
American Industrial Hygienists Association
American Society for Metals
American Society for Microbiology
American Society of Agricultural Engineers
Association of Consulting Engineers of Manitoba
Association of Official Analytical Chemists
Association of Professional Engineers of Manitoba
Association of Professional Engineers of Ontario
Association of Professional Engineers of Saskatchewan
Association of Provincial Research Organizations
Biomass Energy Institute
Canadian Advanced Industrial Materials Forum
Canadian Association of Special Libraries and Services
Canadian Chilled and Frozen Food Association
Canadian College of Microbiology
Canadian Home Economics Association
Canadian Industrial Innovation Centre
Canadian Institute of Food Science and Technology
Canadian Institute of Industrial Technology
Canadian Library Association
Canadian Manufacturers Association
Canadian Research Management Association
Canadian Society of Agricultural Engineers
Canadian Society of Plant Molecular Biology
Canadian Standards Association
Canada Wide Science Fair
Chemical Institute of Canada
Electronics Industry Association of Manitoba
Environmental Choice Management Board, Environment Canada
Furniture West

Home Economists in Business
Human Resources Management Association of Manitoba
Institute of Food Technologists
International Association of Milk, Food and Environmental Sanitarians
Manitoba Association of Home Economics
Manitoba Association of Library Technicians
Manitoba Chamber of Commerce
Manitoba Fashion Institute
Manitoba Food Science Lead Committee
Manitoba Home Economics Association
Manitoba Homebuilders Association
Manitoba Institute of Agrologists
Manitoba Library Association
Manitoba Trucking Association
Minister's National Advisory Council to CANMET
National Association of Corrosion Engineers
National Research Council
Natural Sciences and Engineering Research Council
Networks of Centres of Excellence
Ordre des Chimistes du Quebec
Packaging Association of Canada
Prairie Implement Manufacturers Association
Product Development and Management Association
Red River Community College
Society of Manufacturing Engineers
Society of Plastic Engineers
Solar Energy Society of Canada Inc.
Standards Council of Canada
Statistical Association of Manitoba
University of Manitoba
Winnipeg Chamber of Commerce

Board

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University of Manitoba
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Workers Union
Winnipeg
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President and General Manager
Commercial Plating Inc.
Winnipeg
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Winnipeg
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- **Ms. G. McKillop
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- Dr. J.K. Pulfer
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National Research Council of Canada
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- Dr. J. Reichert
Executive Director
Industrial Technology Branch
Industry, Trade and Tourism
Winnipeg, Manitoba
- Mr. G. Russell
Manitoba Federation of Labour
Winnipeg
- **Mr. A. Thibeault
Vice-President
Muller Hirayama Graves Advertising Ltd.
Winnipeg
- Mr. L. Tough
Manitoba Aerospace Technology
Program
Industry, Trade and Tourism
Winnipeg

*Member of Executive Committee
**Term Expired During the Year

Advisory Committees

MRC uses two industry-based advisory committees (food technology committee and industrial technology committee) to provide advice on the types of services and capabilities needed by local industry. The members on the committees are:

Industrial Technology Committee

Mr. E. Crowder (Chairman)
Mr. George Ranson
Inventronics Ltd.
(Brandon Economic Development Board)
Mr. Glen Catlin
Bristol Aerospace Ltd.
(Canadian Manufacturers Association)
Mr. Robert A. Ashman
GPT Canada
(Electronics Industry Association of Manitoba)
Mr. Jonas Sammons
Fournier Stands Manufacturing of Canada Ltd.
(Furniture West)
Mr. Harry Mardon
Investors Group Inc.
(Manitoba Chamber of Commerce)
Dr. T.R. Hsu
Mechanical Engineering Department
(University of Manitoba)
Mr. William A. Reid
Canadian Bronze Company Ltd.
(Winnipeg Economic Development Board)
Mr. Michael Silver
Western Glove Works Ltd.
(Manitoba Fashion Institute)
Mr. Winton K. Newman
(The Mining Association of Manitoba Inc.)
Mr. Charles Gauthier
Eastman RDC
(Association of Regional Development Corporation)

Mr. Al Harris
(Manitoba Trucking Association)
Mr. Glen Hermanson
(Red River Community College)
Mr. Bruce Maybank
Flair Homes
(Manitoba Home Builders Association)

Food Technology Committee

Mr. H.D. McRorie (Chairman)
Royal Bank of Canada
Mr. Jim Portree
Manitoba Department of Agriculture
Mr. M.F. Wallace
Department of Industry,
Trade & Tourism
Mr. D. Lewis
Industry, Science & Technology Canada
Dr. J. Bole
Morden Research Station
Agriculture Canada
Dr. D. Murray
Department of Food Science
University of Manitoba
Mr. A.R. Tweed
Canadian International Grains Institute
Mr. W.D. Jones
Campbell Soup Company Ltd.
Dr. W. Bushuk
Department of Plant Science
University of Manitoba

MRC acknowledges the essential and valued contribution, guidance and advice of these committees.

Manitoba Research Council Staff

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Vice-President, Food Technology
T. McEwen, A.B., M.Sc., Ph.D.
Vice-President, Finance/Admin.
W. Mialkowski, B.A., B.Comm.
Secretary to the Board
J. Gillespie

Corporate Services

Accounting
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S. Grism, C.G.A.
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D. Waldron, C.A.P.
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J. Lenton
B. McNeill
F. Nicholls
J. Nowoselski
M. Powell
E. Rieger
A. Shaw-Porteous
M. Schmidt
A. Tidsbury

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M. Velpel, Dip. Biochem. Tech.
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K. Rytter, Cert. Lib. Tech.
G. Wilton, B.A., M.A., M.I.L.S.

Co-operative Initiatives with the University of Manitoba

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Advanced Industrial Materials Initiative
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Institute for Technological Development
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